CAN Gateways and Bridges

CAN Gateway Introduction

CAN bridges and CAN gateways are infrastructure components with which complex network structures can be implemented.

CAN bridges can connect CAN networks of different bit rates or protocols with each other. They are based on the store-(modify)-forward principle where CAN messages are received by a sub-network and then transmitted to the other sub-network.

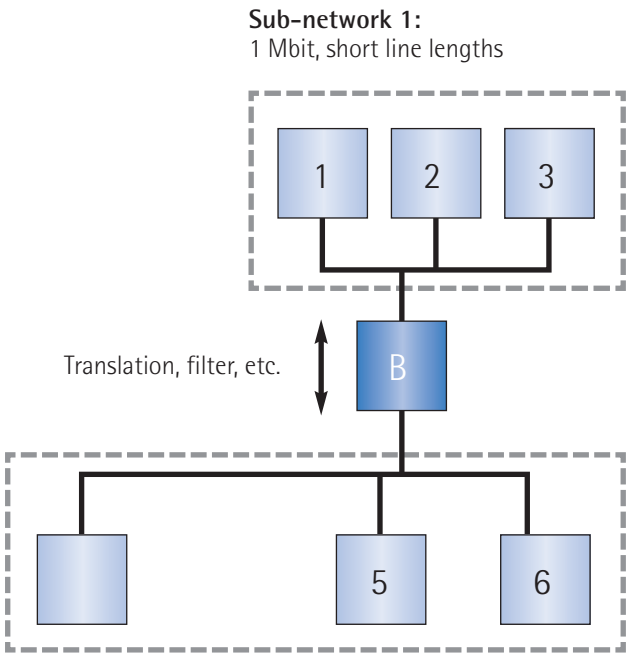
Translation and filter rules can also be used, allowing a protocol adaptation to be carried out between the sub-networks. A bridge can also provide simple gateway functions.

Unlike the CAN repeater, the CANbridge enables the enlargement of the maximum network size so that the sub-systems are fully self-sufficient with regard to bus arbitration. Independent of each other in terms of their real-time behavior, CAN sub-networks connected by bridges are to be regarded as independent networks.

CAN-bridges are appropriate for creating hierarchical networks by transferring only the information to the connected sub-networks via bridges which are relevant to the sub-network. The bridge function can also be executed with the aid of other transmission systems. For example, the CAN-Ethernet-CAN bridge is connected via two Ethernet-TCP/IP gateways which enable connection to remote CAN networks.

As an extension to the CAN bridges, CAN gateways allow for access to CAN networks via other communication systems. In each case, the protocols of the connected bus systems are mapped to the other communication model.

This allows devices with only one serial port to be connected to CAN/CANopen networks via CAN/CANopen-RS232 gateways. Gateways can also provide remote accesses to CAN networks. The CAN-TCP/IP gateway, for example, enables worldwide access to the CAN network for both diagnosistic and service purposes.



Connection of CAN networks with the CANbridge

CANbridge

▶ Configurable CAN/CAN Gateway

OVERVIEW

The CANbridge allows the coupling of two CAN networks, including networks with different bit rates. Unlike a CAN-Repeater, which only translates the electric signals, the CAN messages are received completely by the CANbridge and then sent to the other CAN network in line with existing filter and conversion rules (Store-Forward principle). With the aid of conversion rules (gateway tables), CAN messages can be filtered or forwarded under another identifier. With these mechanisms, the bus load can be reduced in the individual networks by only sending messages which are of interest to the other network.

The CANbridge has a powerful 16-bit microcontroller that can process bursts at higher data rates without message loss. LEDs signal the current status of the coupled networks.

The CANbridge is configured via a configuration file which is downloaded to the device by a loader program.

The CANbridge is available in three different versions: as an industrial version in either a DIN rail housing or in a robust metal housing, and as an automotive version in a robust metal housing.

TECHNICAL DATA

Microcontroller	Fujitsu MB90F543
Memory extension	128 k Flash on-chip, 6 k RAM on-chip (optional 256 k external SRAM), 256 Bytes I2C EEPROM
CAN controller	2 x CAN on-chip, CAN 2.0A, 2.0B
CAN bus interface	2x ISO 11898-2 (High Speed), as an option galvanic isolated or 1x ISO 11898-2 and 1x ISO 11898-3 (low-speed)
Serial interface	RS232 for device configuration
Voltage supply	9-36 V (**Industrial Version**), 7-16 V (**Automotive Version**), 1.5 W
Temperature range	-20 °C to +70 °C
Certification	CE
Housing	Robust metal housing approx. 100 x 85 x 32 mm or plastic DIN rail housing approx. 110 x 75 x 22 mm

CONTENS OF DELIVERY

- CANbridge
- Configuration software for Windows 9x/Me/NT/2000/XP
- Operation Instruction

ORDER OPTIONS

- **Industrial Version:** Housing option, electrical isolation
- **Automotive Version:** second CAN-bus interface according to ISO 11898-2 (high-speed) or ISO 11898-3 (low-speed)

ORDER NUMBER

1.01.0121.11020	CANbridge – **DIN Rail**, 2 x High-Speed Bus Interface, Industrial Version
1.01.0121.22020	CANbridge – **DIN Rail**, 2 x High-Speed Bus Interface (galvanic isolated), Industrial Version
1.01.0120.22010	CANbridge – **Aluminium**, 2 x High-Speed Bus Interface (galvanic isolated), Automotive Version
1.01.0120.23010	CANbridge – **Aluminium**, 1 x High-Speed Bus Interface (galvanic isolated) + 1 x Low-Speed Bus Interface, Automotive Version
1.01.0120.22020	CANbridge – **Aluminium**, 2 x High-Speed Bus Interface (galvanic isolated), Industrial Version

CANmodem/CANopen

For remote access to CANopen systems via telephone line

OVERVIEW

CANmodem is an intelligent gateway that allows remote access to CANopen systems via a conventional AT compatible modem.

The programming interface for Windows 2000/XP (API) provides functions for transmitting and receiving SDO messages as well as for configuration of the CANmodem. PC-based service and monitoring programs can simply access the CANmodem by means of the API via a telephone dial-up connection.

The CANmodem is a full CANopen node and has an object directory, two server SDOs and 127 client SDOs. Data of any length can be read and written via the client SDOs (segment size via Modem is 231 bytes). The module can act as a heartbeat producer and as a heartbeat consumer, can monitor up to 16 devices, and can transmit corresponding events in the CANopen network such as NMT events or heartbeat events. In addition, transmission and reception of any layer 2 messages is possible. This function can be used for transmitting and receiving any PDOs or for using the CANmodem with any CAN protocol.

In the event of service, many SDO accesses to the individual devices occur. The API not only allows SDO accesses to be initiated individually, but it also allows an entire list of SDO accesses to be initiated and transmitted to the CANmodem. This list is then processed locally by the CANmodem and the results are then returned. With many SDO accesses, the propagation time via the telephone line plays a minor role.

The CANmodem can be connected to a conventional, external AT-compatible modem either via the full-duplex RS232 interface or directly to the PC. Communication occurs through a serial protocol based on the HDLC standard. For modem adaptation, a configurable init string can be saved in the object directory.

Connection between the PC and the CANmodem is made by means of a safe callback procedure. For this, the caller gives the CANmodem his callback number, which is then checked by the CANmodem against a prespecified white list. If the relevant number is entered in the white list, the modem calls the caller back and starts an authorization phase based on the CHAP protocol. After successful authorization, the PC application can run all functions on the CANmodem.

TECHNICAL DATA

Microcontroller	Fujitsu MB90F543
Memory	128 kB FLASH, 256 kB RAM
CAN controller	Fujitsu on-chip CAN controller
CAN bus interface	High-Speed ISO/IS 11898-2, galvanically isolated
Baudrate	Up to 1 MBit/s
Serial interface	Full-duplex RS232 interface
Voltage supply	9 - 36 V DC, 1.5 W
Size	100 x 75 x 20 mm
Temperature range	-20 °C to +70 °C
Certification	CE
Housing	Plastic housing for DIN rail assembly

CONTENS OF DELIVERY

- CANmodem/CANopen
- Windows programming interface (API-DLL)
- CANmodem manual, CANmodem API manual

ORDER NUMBER

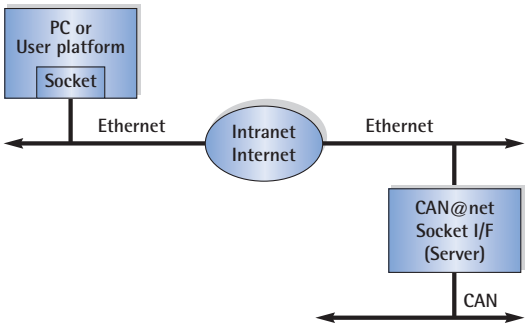
1.01.0122.20000	CANmodem/CANopen
1.04.0130.00000	External Modem

CAN@net II/Generic

CAN-Ethernet Gateway and CAN-Ethernet-CAN Bridge

CAN-ETHERNET GATEWAY

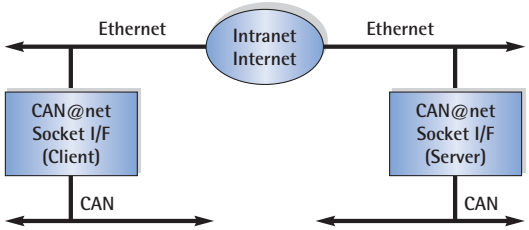
In the gateway mode the CAN@net II/Generic is connected to a PC or to a controller platform via TCP/IP. The application program on the host communicates via a standard TCP/IP socket and uses a simple ASCII protocol. The CAN@net II/Generic offers simple, flexible access to CAN systems via a LAN or via the Internet.



Gateway configuration

CAN-ETHERNET-CAN BRIDGE

Using 2 CAN@net II/Generic, a CAN-Ethernet-CAN bridge can be implemented. This bridge allows for the exchange of CAN messages between two CAN systems via TCP/IP where filter tables can be defined.



Bridge configuration

CONFIGURATION & FIRMWARE UPDATE

The configuration of the TCP/IP parameters can be performed using an easy to handle PC tool with automatic device detection. The configuration of the bridge functionality and the CAN communication is supported by an implemented webserver.

TECHNICAL DATA

PC bus interface	10/100 Mbit/s Ethernet (10-Base T/100-base T), Autodetect, RJ45 connector
IP address allocation	DHCP, via PC tool
Microcontroller	Freescale MCF5235, 150 MHz
Memory extension	8 Mbyte DRAM, 4 Mbyte Flash
CAN controller	1 x Philips SJA1000
CAN bus interface	ISO/IS 11898-2, Sub D9 galvanically decoupled (500V)
Current supply	9-32 V DC, 3 W
Temperature range	-20 °C to +70 °C
Certification	CE, FCC, CSA
Housing	Plastic housing for top hat rail mounting
Size	approx. 22,5 x 100 x 115 mm

CONTENTS OF DELIVERY

- CAN@net II/Generic
- User manual
- Sample programs

ORDER NUMBER

1.01.0086.10201	CAN@net II/Generic

CANlink II

RS232-CAN Converter

OVERVIEW

With the CANlink II, devices with a serial port can be connected to the CAN bus with two modes being available for use in CAN and CANopen networks.

In the CAN mode (layer 2), the received CAN data is transmitted transparently to the RS232 interface. Data sent by means of RS232 is packed in CAN telegrams and transmitted. One configurable identifier is available for each transmission and reception.

In the CANopen mode the CANlink works as a CANopen subscriber, where the serial data is saved as a bytestream object in the manufacturer-specific object dictionary range.

SUPPORTED CANOPEN FEATURES

- 1 server SDO expedited, non-expedited, no CRC check
- 1TX PDO static mapping
- 1 RX PDO static mapping
- Emergency message
- Heartbeat producer
- NMT slave

The communication interfaces and modes are configured with a configuration file which is saved on the device with an upload program.

TECHNICAL DATA

Microcontroller	Fujitsu MB90F543
Memory extension	128 k Flash on-chip, 6 k RAM on-chip (optional: 256 k externel SRAM), 256 Bytes I2C EEPROM
CAN controller	1 x CAN on-chip, CAN 2.0A, 2.0B
CAN bus interface	1x ISO 11898-2 (High Speed), optional: galvanically isolated
Serial port	RS232 (600, 1200, 2400, 4800, 9600,19200, 38400, 57600, 115200 bits/s)
Power supply	9-36 V, 1.5 W
Temperature range	-20 °C to +70 °C
Certification	CE
Housing	Plastic top hat rail housing approx. 110 x 75 x 22 mm

CONTENTS OF DELIVERY

- CANlink II
- Configuration software for Windows 9x/Me/NT/2000/XP
- User's manual

ORDER OPTIONS

- Galvanic isolation

ORDER NUMBER

1.01.0033.10000	CANlink II – DIN Rail
1.01.0033.20000	CANlink II – DIN Rail, with Galvanic Isolation

LIN2CAN

Powerful LIN-CAN-Gateway

OVERVIEW

The LIN-CAN gateway is a universal device for both the analysis of LIN networks via the CAN bus and for the emulation of LIN slave or master modules. In addition, the device can be used as a LIN-PC interface for PC-based configuration and monitoring software or for PC-supported LIN device development.

OPERATION MODES

The LIN-CAN Gateway supports four operating modes:

- LIN-CAN Gateway as LIN Master or LIN Slave
- LIN-Slave Emulation
- LIN-Master-Slave Emulation
- LIN-PC Interface

The various modes can be configured and activated via PC. The configuration is saved as "non-volatile" in the device so that the configured mode can be started automatically after power-on.

TECHNICAL DATA

Microcontroller	Fujitsu MB90F543
Interfaces	1x CAN ISO 11898-2 High-Speed, 1x CAN ISO 11898-3 Low-Speed, 1x LIN, 1x RS232
Memory extension	6 kByte RAM data memory, 128 kByte Flash, 512 kByte external SRAM
Extras	Configurable Sleep mode with Wake up via CAN, LIN or RS232
Power supply	7 V to 16 V DC, 1.5 W
Temperature range	-20 °C to +70 °C
Certification	CE

CONTENTS OF DELIVERY

- LIN2CAN
- Configuration software for Windows 2000/XP
- User's manual

ORDER NUMBER

1.01.0130.00000	LIN2CAN

CANblue/Generic

CAN-Bluetooth-CAN Bridge and CAN-Bluetooth Module with ASCII Protocol

BRIDGE MODE

The bridge mode allows the user to set-up a CAN-Bluetooth-CAN bridge by using two CANblue/Generic devices. Message exchange occurs on layer 2 and is transparent. The CANblue/Generic can also be used in systems that work with CANopen, DeviceNet or customer-specific protocols. Filters for CAN identifiers can be stored in the devices for data exchange via Bluetooth. By using more than two CANblue/Generic devices the coupling of the devices can be made dynamically. Depending upon the existing environmental conditions, the maximum distance between the CANblue/Generic devices is up to 100m.

ASCII PROTOCOL MODE

In ASCII protocol mode, functions for transmitting and receiving CAN messages and for configuring the CANblue/Generic are available to the user based on simple ASCII commands. The CANblue/-Generic is ideal for "non-Windows" systems or embedded platforms that will be connected wirelessly to CAN.

TECHNICAL DATA

Bluetooth interface	Bluetooth specification V2.0, Class 1 / +16,9 dBm (49 mW), 100m
Microcontroller	Infineon C161U, 36 MHz
Memory	256 k Flash, 128 k RAM
CAN controller	1 x SJA1000
CAN bus interface	ISO/IS 11898-2 (High Speed) and ISO/IS11898-3 (Low-Speed), switchable, Sub D9 plug according to DS102, galvanic decoupled
Voltage supply	9 - 30 V DC, 2.5 W
Temperature range	0 °C to +55 °C
Certification	CE, FCC
Housing	stable metal housing
Size	85 x 72 x 35 mm

CONTENTS OF DELIVERY

- CANblue/Generic, manual

ORDER NUMBER

1.01.0125.00001	CANblue/Generic